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Photovoice: A Community-Based Socioscientific Pedagogical Tool

Situating instruction in a local context, socioscientific issues (SSIs) offers students an opportunity to become active participants in the community and has the potential to encourage them to authentically and critically participate and engage in understanding, caring for, and transforming the world to which they belong. Photovoice is one way teachers can empower students and reach these goals.

Developed by Wang and Burris (1994), photovoice is a method by which educators provide cameras for students so they can document issues important to them. Students collaborate on the reasons for and use of their pictures and reflections to showcase relevant issues and generate dialogue with community members and policy makers who may be in a position to mobilize change. The educators' role in photovoice is to facilitate conversation, story-telling, and reflection on pictures taken by the students, and then attempt to codify the emergent themes that are generated by collective discussion. Empowerment of students is one of the key goals of the use of photovoice as a pedagogical tool.

Photovoice as a pedagogical tool

Though SSIs seek to empower students to become involved in the implications of science in the community, students' lives in and out of the classroom are often directed and structured by decisions made by others. Photovoice puts cameras into the hands of students in order to address community issues from their point of view. It offers teachers an insightful insider perspective into the lives of their students. Photography also offers students new and reflective ways to perceive their own world and the science around them. The photos taken by students can create dialogue and serve to advance social action as the community responds to students' perspectives and strives toward solutions. Students are able to participate in a process that may lead to social change.

A community-based socioscientific inquiry on lake quality

Using photovoice as a culminating project, we designed the following unit as a community-based inquiry that incorporated probeware technology for collection of water-quality data in Indiana. While probeware

was employed to simplify measurements of turbidity, pH, dissolved oxygen, phosphorus, and *E. coli*, any water-quality test kit could be used to collect similar data. These kits are often available at no cost to educators through your local department of natural resources, and could be supplemented yearly. Also, a classroom set of digital cameras used for photovoice could be purchased and used annually. Teachers can ask local photo-processing companies to donate their printing services or digital pictures could be showcased on a classroom computer. (See "Picture THIS: Taking Human Impact Seriously" in this issue for additional information.)

While photovoice could be used in any content area at any grade level, this unit was geared toward middle school science students. When planning for a community group discussion, we contacted the local parks and recreation department to inquire about events or gatherings at which students could speak with interested parties. Other community contacts could include school boards, natural resource management groups, and other nonprofit parties. See Figure 1 for additional photovoice

FIGURE 1 Ethical considerations for photovoice (adapted from Youth Voices)

Privacy

Discuss with students the need to get permission before taking someone's picture. One option is to use photo release forms in which students obtain written permission from subjects before taking their picture. Privacy can also be respected by taking pictures in such a way that the identity of the people in the photograph is not clear, for example by taking pictures from far away, or by blurring out faces after the picture is developed.

Safety

As a general rule, students should not take a photograph if it puts them at risk for injury. Students must stay with their chaperones at all times.

Students should wear indirectly-vented chemical splash goggles and protective gloves when collecting and testing lake water. Consult an MSDS for any chemicals used in the testing kit. Be sure all chemicals are approved for use in the middle school lab. Rinse all equipment with distilled water between trials and after use. Some of the probeware is delicate, so encourage students to handle equipment gently. Hiking shoes and weather-appropriate clothes should be worn. Teachers should bring a first-aid kit along.

Misrepresentation

Discuss with students the use of photography as a tool for documenting the reality of their communities, and the importance of not misrepresenting individuals or issues.

Ownership

Photographs should be considered the property of the photographer. Students should get personal copies of all their pictures. Written consent should be obtained from the youth for the use of any pictures that will be displayed to others outside of the project.

Direction/suggestion

As a facilitator, take care not to direct students toward photography of a particular subject area or issue.

Disempowerment

Asking students to document the realities of their communities has the potential to be disempowering if it is not done with a focus on giving students a voice to speak out about issues in their lives. Even if tangible social change is not possible, ensure that the project ends on a note of empowerment and celebration.

FIGURE 2

Vocabulary and rubric to assess water-quality unit (adapted from www.iptv.org/explore/PDFs/Rubrics_and_Student_Projects/WebQuestRubric-Short.pdf)

	Master	Professional	Apprentice	Intern	Score
Support	Who, what, where, when, why, how answered with supporting empirical information—facts, research, statistics, or quotes	Answers the basic questions of who, what, where, when, why, how with supporting information—examples or quotes	Answers the basic questions of who, what, where, when, why, and how	Answers three of the six basic question—who, what, where, when, why, and how.	
Content*	Presents a single issue with thorough explanation of associated concerns and influences	Presents a single issue with adequate explanation of associated concerns and influences	Presents the issue with adequate explanation	Explanation of issue needs more information	
Coverage	Presents issue from more than three viewpoints	Presents issue from three or more viewpoints	Presents issue from two viewpoints	Presents issue from one viewpoint	
Clarity	Provides information that clarifies viewpoints, attitudes, and involvement beyond the average coverage to communicate additional insights	Provides information that clarifies viewpoints, attitudes, and involvement that communicate additional insights	Provides adequate information of the issue that suggests additional insights	Provides minimal coverage of the topic	
Organization	Well organized with an engaging introduction	Organized with a good introduction	Somewhat organized with an adequate introduction	Disorganized with a weak introduction	
Sources	Uses and cites three or more print and internet resources	Uses and cites two print and internet sources	Uses and cites one print and one internet resource	Uses and cites one print or internet resource	
G.U.M. (grammar, usage, mechanics)	Uses words, spelling, and punctuation accurately and correctly with no errors	Uses words, spelling, and punctuation accurately and correctly with no errors	Uses words, spelling, and one punctuation accurately and correctly with no spelling errors	Uses words, spelling, and punctuation accurately and correctly with two or more errors	
Style	Effectively uses advanced sentence structure and vocabulary	Effectively uses sentence structure and vocabulary	Sentence structure and vocabulary correct	Sentence structure and vocabulary are unclear two or more times	

*Content should include a presentation of the following: Water-quality data in charts or tables, written interpretations of the data, use of unit vocabulary, and recommendations for improving the lake's water quality. Vocabulary could include nutrients, water table, nonpoint source pollution, erosion, pH acid, sedimentation, watershed, groundwater, point-source pollution, runoff, nitrate, acidic/alkaline, invasive species, macroinvertebrates, aquatic plants, microbes, infiltration, Phosphate, dissolved oxygen, native species-plants, salinity, thermocline, stream bed, turbidity, pollution/pollutants, surface water, and eutrophication.

information such as safety and ethical considerations for photo taking, and Figure 2 for an assessment rubric of this unit.

Conclusion

Active, project-based, constructivist SSI teaching where students ultimately take action in the community after studying the science content, the societal implications of technological devices and their uses, and the relevant community dimensions at play in science is a powerful tool for engaging students in building their higher-order thinking skills, decision-making skills, and understanding of scientific knowledge. Using the tool of photovoice helps students experience empowerment through SSI activities by encouraging them to care for the environment and educate others about their perspective. ■

References

Wang, C., and M. Burris. 1994. Empowerment through

photo novella: Portraits of participation. *Health Education Quarterly* 21 (2): 171–86.

YouthVoices—www.youthvoices.ca/photovoice.html.

Resources

Environmental Protection Agency: Clean lakes—www.epa.gov/owow/lakes

Freshwater aquatic creatures and other information on ponds and lakes—www.mbgnet.net/fresh/lakes

Point and nonpoint source pollution—www.lz95.org/mss/lz95online/wetlandwq/sourcepollution.htm

Water quality of inland lakes (includes water-quality reports on Great Lakes)—http://science.nature.nps.gov/im/units/GLKN/monitor/InlandLakesWQ/WQ_InlandLakes.cfm

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Activity Worksheet: Listening to the lake

The mission

Local residents are asking expert middle school scientists to take on some important tasks: (1) to identify, document, research, and propose solutions to management issues facing the Griffy Lake Nature Preserve and (2) to dialogue with the Bloomington community about the health of this local water source and recreational lake area.

The itinerary

1. Working as a water-quality inspection team (2–4 students per group), you will identify what data need to be collected about Griffy Lake and how to go about collecting those data. What information will you need? What materials/equipment? How will you collect the information? How will the data be recorded? You will want to conduct research online to investigate management techniques and water-quality information (see Resources). *Note to teachers: This is a time for guided exploration. Have students search the internet (see Resources) to gain an understanding of what is important to consider when investigating water quality. Some prompts to guide students' research are: What is Griffy Lake being managed for (e.g., recreation, fishing, water clarity)? What water-quality measures are important for this management? For example, if swimming is allowed, then we will*

want to know something about the E. coli in the water. How will you collect this information? What are the appropriate tests to find this out? What safety precautions will you need to carry out when collecting the data using the materials/equipment?(See Figure 1.)

Safety precautions would include having students wear proper hiking shoes and weather gear, as well as taking sanitation measures for data-collection trials. As students begin locating information, provide or have them develop a standard water-quality data table to record their results about such factors as E. coli, turbidity, phosphorus, Secchi disk, pH, ammonia, nitrogen, chlorine, calcium, dissolved oxygen, and biological oxygen demand. Teachers can prepare the data chart around the materials and instructions in the water-quality kit they use.

2. You will be traveling to Griffy Lake Nature Preserve to research and collect data. You will be provided with laboratory materials/equipment you previously identified to assist your research. You will also be provided with a camera so that you can document the lake issues that you think are the most important. Ideas for photos include: Pictures of strengths and weaknesses of the lake, things around the lake that you want to talk about or change, or simply how you see the lake and its importance. See Figure 1 for ethical and safety considerations prior to taking pho-

tos. Your teacher will give you basic training on using the cameras and specific instructions for photo processing or how to submit photos electronically. *Note to teachers: Be sure students know what materials/equipment they will be using and how to use them effectively. Bringing water samples into the classroom to test prior to the field trip is strongly recommended. Also, a discussion about proper recording techniques and multiple trials should accompany this practice session in the classroom. Practice with all cameras beforehand and prepare instructions to fit the particular type of cameras that you will be using. Also, be sure to follow district guidelines for the field trip and ensure all chaperones understand and can help students with proper safety precautions.*

3. After the field trip, the class will pool data and develop summary charts that reflect your understanding of current lake conditions and concerns. As a class, you must decide which data and photographs are most informative to present to the community. (*Note to teachers: Students should try to narrow down the photos they bring back to the classroom to no more than five.*) You will also individually write narratives for the photographs you took. Each team member should select one or two pictures that they want to discuss with community members. In choosing your photograph, ask yourself which one(s) best depict the issues you have explored. You should choose pictures that you are comfortable sharing and talking about. For your narrative, write about what is happening in the picture, why you took the picture, and/or what it means to you. See below for more ideas for writing the photo narrative:

- What is the issue?
- Why is this an issue?
- Why is this issue interesting or important?
- Who is affected by this issue?
- Where is this issue occurring?
- When did this issue become evident?
- What does the future look like for this issue?

Individual team members will need to write captions for their selected photo(s). Use the "SHOWED" format below to generate captions, tell the story of the pictures, or identify the issues and themes that emerge (see Youth Voices in References):

S: What do you see here?

H: What is really happening here?

O: How does this relate to our lives?

W: Why does this problem or strength exist?

E: How can we become empowered about this issue?

D: What can we do about it?

As a class, we will discuss our photos and narratives before presenting to the community. *Note to teachers: When developing themes, have individual students volunteer to read their narratives aloud to the class while you write on the board key phrases from their narrative. For example, if a student's narrative says something like: "The fish in this picture look like they are swimming in a grease puddle," you might record on the board "fish, pollution." Once you have done this with a few narratives, have students look at the key phrases to identify common themes of the narratives. For example, a theme might be "protecting fish." After modeling this, teams will continue theme generation by reading their narratives to one another and developing a list of common themes. One representative from the group will share the themes with the rest of the class to develop a larger list of themes. Through this discussion, certain common issues or themes can emerge that lead to main ideas or messages that the class wants to communicate to the community. This not only allows students to note the diversity in meaning of the preserve to their peers but also helps to articulate the overall classroom message students wish to convey to the community.*

4. Finally, you will be regrouped according to similar themes and will present their collective ideas to the community about issues, concerns, and proposed solutions to help with managing this important lake and recreational site. Your class will showcase photos, narratives, and summary charts to an interested and informed community group and talk about ways to effectively manage Griffy Lake Nature Preserve. You can pair up with peers who have similar or contrasting themes for your presentation. Before presenting to the community, be sure to check the rubric to make sure that you are covering all facets of the project in their written reports (see Figure 2). Each original data-collection team will hand in a written report of their data and recommendations for improving water quality. *Note to teachers: Please spend class time discussing proper charting and graphing techniques if students will be using these in their presentations and written reports. It is helpful if teachers either invite local Department of Natural Resources community members or lake officials to the classroom for the student presentation or find out when a local environmental town meeting is occurring and ask if students can attend to share their impressions of the lake.*